EXD.R

Vol. 9. Part 4. Pp. 57-72. 15th April, 1940.

P. INST. ENT.
LIBRARY —
15 APR 1940
En. 344 B

THE PROCEEDINGS

OF THE

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Series B.
TAXONOMY
(being the continuation of Stylops)

World List abbreviation: *Proc. R. ent. Soc. Lond.* (B)

CONTENTS

PAGE

FRASER, Lt.-Col. F. C., I.M.S. Retd., F.R.E.S. A note on the classification of *Zacallites balli* Cockerell (Upper Eocene) (Order Odonata) 62–64, 2 figs.

MAMET, Raymond. A new genus and five new species of COCCIDAE (Hemipt. Homopt.) from Mauritius . . . . . 65–72, 4 figs.

SCOTT, Hugh, Sc.D., F.R.E.S. NYCTERIBIIDAE from southern Brazil (Diptera) . . . . 57–61, 4 figs.

LONDON:

PUBLISHED BY THE SOCIETY AND

SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W.7

Price 3s. 0d.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

Founded, 1833. Incorporated by Royal Charter, 1885.

PATRON—HIS MAJESTY THE KING.

OFFICERS and COUNCIL for the SESSION, 1940-1941.

K. G. Blair, D.Sc., *President.*

G. Fox-Wilson.
J. C. F. Fryer, O.B.E., M.A. } *Vice-Presidents.*
N. D. Riley.

N. D. Riley, *Treasurer.*

O. W. Richards, M.A., D.Sc., *Secretary.*

F. J. Griffin, A.L.A., *Registrar.*

Other Members of Council.

E. A. Cockayne, M.A., M.D., F.R.C.P.
C. N. Hawkins.
Col. F. A. Labouchere.
Hugh Main, B.Sc.
Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S.
A. M. Massee, D.Sc.
The Hon. Miriam Rothschild.
J. Smart, B.Sc., Ph.D.
W. R. Thompson, Ph.D., D.Sc., F.R.S.
B. P. Uvarov, D.Sc.
A. Welti.
V. B. Wigglesworth, M.A., B.Ch., M.D., F.R.S.

Finance and House Committee.

A. Welti (Chairman).

Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O.
C. N. Hawkins.
Francis Hemming, C.M.G., C.B.E.
R. W. Lloyd.
J. Smart, B.Sc., Ph.D.

Publication Committee.

V. B. Wigglesworth, M.A., B.Ch., M.D., F.R.S. (Chairman).

E. A. Cockayne, M.A., M.D., F.R.C.P.
G. Fox-Wilson.
A. M. Massee, D.Sc.
Hugh Scott, M.A., Sc.D.
W. R. Thompson, Ph.D., D.Sc., F.R.S.

Library Committee.

B. P. Uvarov, D.Sc. (Chairman).

E. B. Britton.
B. M. Hobby, M.A., D.Phil.
R. W. Lloyd.
W. H. T. Tams.
W. R. Thompson, Ph.D., D.Sc., F.R.S.

Committee for the Protection of British Insects.

W. G. Sheldon (Chairman).

Capt. E. Bagwell-Purefoy.
C. L. Collenette.
W. J. Dow.
J. C. F. Fryer, O.B.E., M.A.
Col. F. A. Labouchere.
N. D. Riley.
H. M. Edelsten (Secretary).

The Executive Officers of the Society are *ex-officio* members of all Committees.

DELEGATES OF THE SOCIETY TO:

1. **British National Committee for Biology** (Royal Society).
   Sir Guy A. K. Marshall, C.M.G., D.Sc., F.R.S., appointed 1939.
   Dr. Karl Jordan, F.R.S., appointed 1936.
2. **Conference of Delegates of Corresponding Societies of the British Association for the Advancement of Science.**
   Mr. H. B. Cott, M.A., appointed 1939.
3. **International Congress of Entomology** (Berlin 1938).
   J. C. F. Fryer, O.B.E., M.A. *Francis Hemming, C.M.G., C.B.E.*
   A. D. Imms, M.A., Sc.D., F.R.S.
4. **Local Committee of Management of Wicken Fen.**
   Mr. H. M. Edelsten. *Mr. E. C. Bedwell.*
   [Delegates nominated by Committee for the Protection of British Insects.]
5. **National Trust for Places of Historic Interest or Natural Beauty.**
   Mr. W. G. Sheldon, appointed 1922.
6. **New Forest Association.**
   Mr. W. Fassnidge, appointed 1934.
7. **Royal Meteorological Society. Phenological Committee.**
   Dr. C. B. Williams, appointed 1937.

NYCTERIBIIDAE FROM SOUTHERN BRAZIL (DIPTERA)

By Hugh Scott, Sc.D., F.R.E.S.

(*Department of Entomology, British Museum (Natural History)*).

In October 1938, I received from the late Dr. Walther Horn some Nycteribiidae collected by Herr Fritz Plaumann at Nova Teutonia in Southern Brazil. I almost immediately communicated the result of a preliminary examination of the specimens to Dr. Horn in a letter, but added that I should be unable to complete my study of them for some months. I regret, therefore, that this paper was not written before Dr. Horn's lamented death. The letters which passed between him and myself about these insects were the last in a correspondence which had extended through twenty-eight years. I am indebted to Dr. Hans Sachtleben for kindly prolonging the time during which I might keep the specimens.

The collection consists of two species. Both are referable to the genus *Basilia*, to which belong all Nycteribiidae hitherto discovered or recorded with certainty in the American continents. Recently I enumerated thirteen American species of *Basilia* (see 1936, *J. Linn. Soc. Lond.* (*Zool.*) **39** : 495–8), including one described as new. The number was increased to fourteen by my description of *Basilia pizonychus* from certain islands in the Gulf of California (1939, *Allan Hancock Pacific Exped., Rep.* **2** (10)). The total is now raised to fifteen, since one of the species discussed in the present paper is new (the second was previously known from Paraguay).

In 1936 I commented (*op. cit.* : 498) on the disparity in numbers between the Nycteribiidae recorded from the Americas and those known from the Old World and Australasia. The Old World and Australasian species together amounted to about six times the number discovered in the Americas. Though the known American species will doubtless be further increased, they will probably remain far behind those of the Old World and Australasia. The disparity is almost certainly real, and not due entirely to the accidents of exploration and discovery. This is rendered more likely by the fact that only one genus is, so far as is known, represented in the Americas.

The new species described below does not appear to be very closely related to any other species of the genus. The tibiae have three incomplete pale rings, more marked than in other American species of *Basilia* which I have seen, though such rings can be faintly traced on the ventral side of the tibiae in some other species. Their presence may indicate a relationship between *Basilia* and *Cyclopodia*, a matter which I discussed in 1917 (*Parasitology* **9** : 606).

Nova Teutonia, where Herr Plaumann collected the insects under review, lies in the State of Santa Catharina, in 27° 11′ South Latitude and 52° 23′ West Longitude. It is more than 200 miles inland from the Atlantic coast. No Nycteribiidae have, as far as I know, been obtained from this part of Brazil before. One of the two species was, however, originally found in the adjacent country of Paraguay, at a place some hundreds of miles north-west of Nova Teutonia.

The bats from which the specimens were taken were also sent to the British Museum, but unfortunately their condition was not good enough for precise determination. The specific names of the hosts are, therefore, given with reserve.

Pencil drawings were made by myself from specimens lying in alcohol. My method is to lay the insect in a shallow glass dish on a small white-papered piece of cork held down with small weights. The specimen can then be kept steady by means of the finest silver or nickel pins, bent at an angle so as to form minute hooks. A Zeiss drawing-apparatus is used in drawing the outline and main features, some details being filled in freehand, after the outlines have been traced on to Bristol Board. In the present instance I am indebted to Miss Dorothy Fitchew for inking over the pencil drawings and completing certain parts.

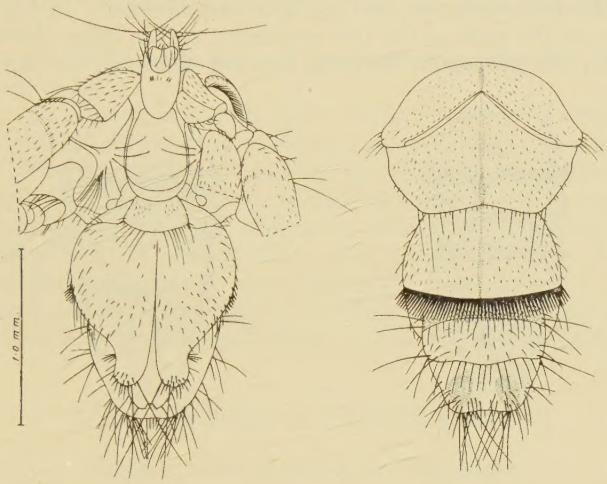
In this matter I can only give my personal experience. Having studied Nycteribiidae at intervals for more than thirty years, I still find that descriptions and comparisons are best made from specimens in spirit viewed as opaque objects, rather than from cleared specimens mounted in balsam. Owing to the comparatively large size and the thickness of the body in many species, to the curvature of the abdomen in the male and its roundness in the female (especially when gravid), a truer impression of the appearance is gained from specimens in alcohol. Though slides are more quickly and easily handled, cleared specimens are often so distorted that it is impossible to make a satisfactory drawing, while details of the dorsal, lateral and ventral surfaces are liable to be confused. When mounting in balsam is successful, however, the preparations are a most useful adjunct to specimens in alcohol. (Dried and pinned specimens are generally useless, as I have repeatedly stated. The desiccation causes shrinkage and distortion, and the pin usually obliterates important characters.)

Basilia plaumanni sp. n.

Length about 2 mm. *Head* with two short setae on the vertex between the eyes; the front margin bears fewer setae than in some species, having on either side only two or three longer ones in front of the eye, then a long gap without setae, and one shorter seta near the lower corner; *eyes* dark-pigmented and plainly two-faceted. *Thorax* with the curved dorsal series of setae on either side numbering ten or eleven, long and very fine; mesonotum elevated behind in both sexes, its chitinous rim forming a nearly vertical wall behind, as in *B. carteri* Scott; ventrally the thorax, though broader than long, is longer than in some species (e.g. *B. carteri*); the ratio of its length to its breadth, measured with a camera lucida, appears about 3 : 4, but allowance must be made for the curvature. *Legs*, especially the tibiae and metatarsi, noticeably long and slender, tibiae not dilated and very little flattened laterally; the three obliquely transverse pale bands, where the sclerotisation is weak, are more marked than in other species, and reach nearer the front margin of the tibia (this may be partly due to the generally weak sclerotisation of the only two specimens hitherto discovered, which are probably immature). The *ctenidium* on the hind margin of the basal abdominal sternite consists of about 54 teeth in the male, and 56 in the female, specimen.

Abdomen of female (figs. 1, 2): the important distinguishing characters are shown in fig. 1. The small basal tergite is approximately pentagonal, broadening from the base to the hind corners, and slightly produced to a very obtuse angle in the middle of the hind margin; its definitely angular form is characteristic and contrasts with that in several other species, in which the outline is curved; the arrangement of the very short setae on the surface, and long setae on the hind margin, is shown in fig. 1. Second tergite long, divided, with side margins arcuate in front and sinuate behind, produced into two processes, each of which bears a cluster of stout dark spines and two very long setae directed inwards; parts of the surface bear very short setae and there are rather longer setae close to the side margins in the middle third of the length. Partly hidden beneath the processes of this tergite is the anal segment, in the form of a truncated cone, with a long stout seta on either side near the hind

angle, and two or three other setae, of varying length, on either side margin; its dorsal surface is bare. Behind and beneath the anal segment is the subgenital plate, bare above, but with numerous long setae projecting from its ventral surface. Ventrally, the second sternite (almost hidden under ctenidium in fig. 2) is closely covered on the surface with setae, not very short, and has other setae, moderately long and not close, on its hind margin, and two longer setae, directed outwards, at either hind angle. Third sternite rather long, very slightly produced at the hind margin in the middle third of its breadth, with surface bare except for a submarginal series of sparse, short setae, and with the marginal setae long, differing in length and not very close, as well as two long ones, outwardly directed, at either hind angle; subgenital plate narrowing from base to hind end, with hind margin subtruncate, very slightly sinuate in the middle, with hind angles rounded off, with a vaguely marked, slightly more sclerotised, patch on either side near the hind angle, two groups of long stout setae on the hind margin, rather shorter and finer setae on the posterior part of the



FIGS. 1–2.—1, *Basilia plaumanni* sp. n., ♀, dorsal view; only basal parts of legs shown.
2, *Basilia plaumanni* sp. n., ♀, ventral view of thorax and abdomen.

surface, and also some directed outwards from near the side margins in the posterior half of its length.

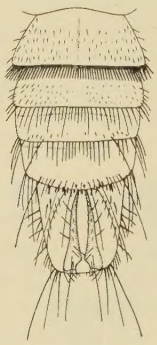
Abdomen of male (fig. 3): the small basal tergite has short setae on its hind margin, and a few very minute setae on the surface on either side of the middle line. Tergite 2 has scattered short setae on the surface, mostly in the basal half; tergites 3–6 have the surface bare; in tergites 2–5 the marginal setae are longer but not very close, and very short submarginal setae alternate with the marginal ones; on tergite 6 the marginal setae are very long, and increase in length towards the middle line, where there is a gap in the series, on either side of which the setae are directed outwards; anal segment rather narrow, with erect setae, moderately long, at the sides and on the posterior half of the dorsal surface, and three very long ones at either hind angle. Ventrally, the second sternite has its surface covered with very short setae, and marginal setae of different lengths. Third sternite bare except for an irregular submarginal series of very short setae; in the marginal series, several of the setae towards either side are very long. Fourth sternite bare, except for a submarginal series of fine setae, among which six are very long; the hind margin has several stout and long setae at either side, and about half its length, in the middle, is occupied by an irregular series of some 20 stout spines, the outer ones on either side rather widely spaced, those nearer

the middle in some cases one in front of the other. Claspers rather slender, slightly curved inwards and upwards, gradually tapering to a sharp point.

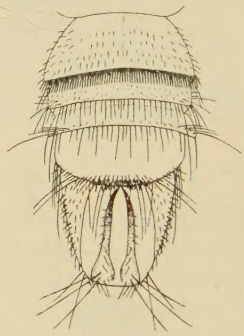
South Brazil: Nova Teutonia, 21.vii.1938, from "Fledermaus No. 2" (*Histiotis* sp., possibly *H. velatus* I. Geoffr.) 1 ♂, 1 ♀ (*F. Plaumann*).

Type ♀ and paratype ♂ in the Deutsches Entomologisches Institut, Berlin-Dahlem.[1]

On the whole *B. plaumanni* does not closely resemble any described species. It is characterised by the fewness of the setae on the front of the head, by the length and slenderness of the legs, and by the form of the abdominal segments in the female. In the last respect it recalls to some extent *B. corynorhini* (Ferris) (1916, *Ent. News* **27** : 435–6, pl. 23, fig. 3), which was described from a single specimen taken in California on a species of *Corynorhinus*. The resemblance is due to the large, divided, second visible tergite being of the same shape as the tergite which Ferris takes to be the third in *B. corynorhini*. In the arrangement of the bristles on the ends of the two processes, and in other details of chaetotaxy, however, the respective tergites are not the same in the two species.



3



4

Figs. 3–4.—3, *Basilia plaumanni* sp. n., ♂, ventral view of abdomen. 4, *Basilia carteri* Scott, ♂, ventral view of abdomen, drawn from an example from Nova Teutonia.

Moreover, the basal tergite is quite differently shaped in the two, and I can see nothing in the female of *B. plaumanni* corresponding to the sclerites which Ferris judged to constitute the second tergite in *B. corynorhini*. The ventral side also differs considerably in the two species.

Basilia carteri Scott, var.

Basilia carteri Scott, 1936, *J. Linn. Soc. Lond.* (*Zool.*) **39** : 498–502, figs. 9, 10.

A series of thirty-one specimens is referred to this species, though in nearly all the female examples a slight divergence from the type is visible in the abdominal segments. The principal difference lies in the form of the basal tergite, which in the specimens now before me is narrower, with sides less arcuate, and narrowing to a more definitely truncate hind margin; some allowance must, however, be made for the very gravid condition of the specimens from which the female sex of *B. carteri* was originally described, a condition which caused the tergites to be much stretched transversely. The

[1] Written shortly before the outbreak of war, which prevented my sending the specimens back to Berlin. They remain at present (September, 1939) in my charge.

arrangement of setae on the large second tergite is also slightly different; those on the front part of the surface on either side are more scattered, forming a less definite oblique band; on the hind margin the short setae of the submarginal series are much fewer, being absent near the middle line, while on either side there is usually only one short seta between each two long ones, and the long setae on either side of the middle are not so long as in the typical form of *B. carteri*; the setae on the anal prominence are also rather fewer. On the ventral side, the setae are sparser on the two pairs of transverse slightly sclerotised areas on the membranous posterior sternites, the short setae in particular being fewer; the two sclerotised areas on the subgenital plate are also more sparsely setose, each having no short setae on the surface but only a group of stout setae, some of which are fairly long, near the hind angle.

Two of the female specimens are of the typical form, a fact which confirms the view that the difference presented by the majority does not constitute a distinct species.

The abdomen of the male has not previously been figured, but its ventral aspect is shown in fig. 4.

South Brazil : Nova Teutonia, 10.vii.1938, 1 ♂, from " Fledermaus No. 1 " (*Myotis* sp., possibly *M. ruber* E. Geoffr.); same locality, 29.viii.1938, 10 ♂♂, 20 ♀♀, from " Fledermaus No. 3 " (*Myotis* sp., possibly *M. albescens* E. Geoffr.).

Basilia carteri was described from specimens found in the Paraguayan Chaco, at Makthlawaiya, on *Molossops temmincki* Burm. Makthlawaiya is situated 23° 25′ S. and 58° 19′ W., about sixty miles west of the river Paraguay, and roughly 500 miles north-west of Nova Teutonia.

Specimens from the series collected by Herr Plaumann are in the Deutsches Entomologisches Institut, Berlin-Dahlem, and in the British Museum.[2]

ADDENDUM—A CORRECTION.

Basilia ferrisi Schuurmans Stekhoven.

Basilia ferrisi J. H. Schuurmans Stekhoven (Jr.), 1931, *Z. ParasitenK.* **3** : 217.
Basilia ferrisi Scott, 1936, *J. Linn. Soc. Lond. (Zool.)* **39** : 497, 502; 1939, *Allan Hancock Pacific Exped. Rep.* **2** : 168–9.

The species *B. ferrisi* was first described and figured in 1924 by Ferris, who believed it to be identical with *B. speiseri* (Ribeiro 1907), and, considering himself to be re-describing *B. speiseri*, referred to it under that name. Dr. Schuurmans Stekhoven, however, recognised that the two species are distinct, and in 1931 proposed the name *Basilia ferrisi* for that described by Ferris. I overlooked the remarks of Dr. Schuurmans Stekhoven, and proposed the same name in 1936. I have also since referred (1939) to the species as *Basilia ferrisi* Scott, but, since Dr. Schuurmans Stekhoven had proposed the name several years earlier, the insect must be known as *Basilia ferrisi* Schuurmans Stekhoven.

[2] Owing to the outbreak of war the whole material remains at present (September, 1939) at the British Museum in my charge.

A NOTE ON THE CLASSIFICATION OF *ZACALLITES BALLI* COCKERELL (UPPER EOCENE) (ORDER ODONATA)

By Lt.-Col. F. C. Fraser, I.M.S. Retd., F.R.E.S.

For the correct interpretation of the main veins in fossil insect wings, it is important to recognise that the strength or weakness of these veins is dependent upon whether the wing is being viewed from above or from the reverse side. The membrane of an insect's wing is not attached to the sides of the main veins but, in the case of the anterior or convex ones, slightly to the posterior side, and in that of the posterior or concave ones, to the anterior side. This is because of the different planes in which the anterior and posterior veins lie, necessitating a zigzagging or pleating of the membrane as it passes from one vein to another. The result of this is that an anterior impression will show a great deal of the anterior veins but very little of the posterior so that these latter may appear thin and weak. A posterior impression will, of course, show an exactly opposite condition. Although this is not very obvious macroscopically in the wing itself, on account of its translucency, it is so in the fossil which is only an impression and not the wing itself which one views.

Failure to appreciate these facts may lead to an apparent weak vein being mistaken for a supplementary or intercalated one and the subsequent one for that which the weak vein actually represents.

I have recently come across an example of this in *Zacallites balli* Cockerell (Upper Eocene). Although found in the Eocene, Professor Cockerell compares it to species of the Liassic fauna and places it in the suborder Anisozygoptera of the Odonata, regarding it as a surviving relic which has extended into the Eocene. There is, of course, no impossibility in such a theory, but when one remembers how rare such survivals are and how rare fossil wings are, the possibility of an error having been committed in the determination of the specimen arises. For myself, I am convinced that the correct position of this insect is in the suborder Zygoptera and at the very root of the family Epallagidae. A series of errors has resulted from the misinterpretation of an apparent weak vein which follows immediately after MA, as an intercalated vein (the Tillyardian notation has been employed by Professor Cockerell and is again employed here). Following on this, the next vein has been interpreted as Cu2 (Cu1 of Needham–Comstock and CuP of Tillyard) and the anal vein is made out to be entirely absent or, at the most, represented by a weak, interrupted vein which is obviously only a branch of the analis.

I base my interpretation on the following points :—

(1) The impression is an anterior one and so the posterior veins appear very weak as compared to the anterior ones. In the figure given in the author's paper (1928, *Ent. News* **39** : 301) the comparative strength of the costa, IR3 and 1A may be contrasted with the thinness of the subcosta, R4 + 5 and CuP respectively.

(2) The vein which has been interpreted as Cu2 will be seen to make an abrupt posterior bend immediately after leaving the quadrilateral. This is a character which is quite unknown among either recent or fossil Odonata, but which, on the contrary, is a constant character of the anal vein throughout the order.

(3) The vein designated as Cu2 *is a convex one.* Now Cu2 is a concave vein, so that by no possibility could this vein represent it : it is in fact the convex

anal vein and the author's supposed intercalated vein, which is concave, is actually the true Cu2.

This new interpretation of the venation of *Zacallites balli* alters entirely the previous conception of its age and place in the order Odonata. Although the stem of Cu2 is not visible in the fossil, it must have been present and if the distal portion of the vein, which is visible from just beyond the quadrilateral, be prolonged basally, it will cut the quadrilateral into two cells, the anterior one being the true quadrilateral of the Zygoptera, and the posterior one the subquadrilateral. The broad rectangular cell which Professor Cotterell likens to the quadrilateral of *Petrophlebia* and *Diastatomites* is only the combination of these two cells, with the dividing cubitus obliterated, and, I think, that if the fossil be examined carefully, it will be found that the broad quadrilateral cell

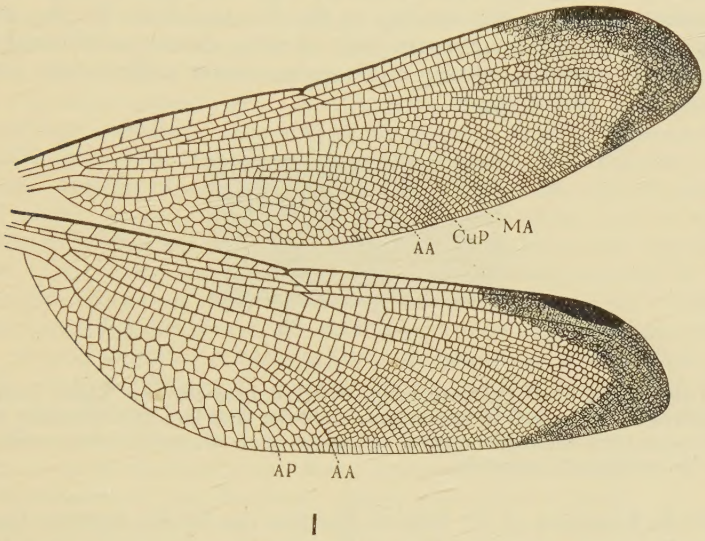


FIG. 1.—Wings of *Zacallites balli* Cockerell restored. (Original.)

consists of two rectangular planes, placed at an angle to one another, the line of junction representing the invisible cubitus. The broken vein which has been interpreted as the anal vein is merely a branch or posterior anal vein and its counterpart is plainly visible in the living *Epallage fatima* Charp., to which species *Z. balli* bears a remarkably close resemblance, even to the black-tipped apices of the wings.

In a previous paper I have expressed the opinion that the EPALLAGIDAE have arisen from the AMPHIPTERYGIDAE, in which family the nodal complex is incomplete and Rii + iii runs straight out from Rs. Both these characters are present in *Zacallites* but, for the rest, the venation and the general build of the insect all agree with EPALLAGIDAE, so that it may be regarded as a hitherto missing link between these two families and it thus assumes an importance which was quite unsuspected.

A new definition of the family ZACALLITIDAE may now be given.

ZACALLITIDAE Cockerell.

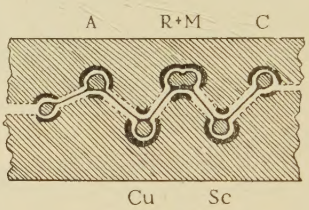
Moderately large and robust insects with Zygopterous facies and sharing characters belonging to the families AMPHIPTERYGIDAE and EPALLAGIDAE. Wings distinctly but

shortly petiolate, subfalcate in shape, hind-wing rather broader than fore-wing, especially near the base; discoidal cell an undifferentiated quadrilateral cell followed posteriorly by a subquadrilateral of similar shape; nodal index incomplete, primary antenodals present, accessory antenodals non-coinciding; Rii + iii running straight out from Rs without any anterior curve at its origin; Riv + v and IRiii arising nearer the arculus than nodus and at about equal distances from each other and the arculus; nodus situated slightly proximal to centre of costal margin; pterostigma elongate, slightly tumid at middle, followed by two rows of cells distally; one or two rudimentary branches to anal vein; reticulation close, rather irregular towards apices; male anal appendages forcipate.

One genus—*Zacallites*, and one species, *balli* Cockerell, the genotype.

Horizon: Upper Eocene, N. America.

Related to the AMPHIPTERYGIDAE by the incomplete nodal index and straight origin of Rii + iii; related to the EPALLAGIDAE by the wings but slightly petiolate, nodus near centre point of wing, short quadrilateral discoidal cell, sigmoidally curved anal vein and supplementary rudimentary anal veins.



2

FIG. 2.—Diagram of fossil Odonate wing, extreme base shown. Thick lines indicate the area of veins exposed to impression; note the false idea of alternating strong and weak veins such impressions give. *C.* costa, *R* + *M*, radius plus media, *A.* anal vein, *Cu.* cubitus, *Sc.* subcosta.

Mr. D. E. Kimmins of the British Museum has kindly expressed to me his opinion on the correct interpretation of the venation of *Zacallites balli* Cockerell. He wrote: "I have had a look at Cockerell's *Zacallites* and also consulted Dr. Zeuner about it. We both think that your suggestion is the more probable. It is difficult to be certain without examination of the specimen, but as far as one can tell from his photograph it is more likely that his supplementary vein should be Cu2, than that Cu2 should be absent, for the curved vein is almost certainly the first anal."

To the same horizon in N. America belong two species described by Professor Cockerell, one belonging to the AMPHIPTERYGIDAE (*Protamphipteryx basalis* Cock.) and the other to the AGRIIDAE (*Eocalopteryx atavina* Cock.). The latter consists of only a fragment, the apex of a wing, which, as I have pointed out to Professor Cockerell in correspondence, from the characters it displays, I am unable to separate from the recent Asiatic genus *Mnais* Selys. The nearest relative to *Zacallites balli* is the recent *Epallage fatima* Charp., from central Asia and S.E. Europe, and all other near relatives are Oriental in distribution. It seems evident that the superfamily AGRIOIDAE was at one time richly represented in N. America and came into much closer relationship with the Asiatic fauna than it does to-day.

A NEW GENUS AND FIVE NEW SPECIES OF COCCIDAE (HEMIPT. HOMOPT.) FROM MAURITIUS

By Raymond Mamet.

(*Rose Hill, Mauritius.*)

The new species described below have been kindly examined by Dr. W. J. Hall, whom I thank for his kind assistance on many occasions.

Ripersia pileae sp. n.

Adult female (fig. 1, *a*) broadly rounded anteriorly and pointed posteriorly, completely enclosed in a white felted sac. Yellowish in specimens preserved in 70 per cent. alcohol. Length: 1·5–1·6 mm.; breadth: 0·7–1·1 mm.

Antennae (figs. 1, *b* and *c*) 6 or 7 jointed; all the joints with several slender setae, the two last joints with a few stouter setae. Terminal joint longest. Formula of 6-jointed antenna: 6, 3, 2, 1, 5, 4; sometimes showing a pseudo-articulation in the third joint. Formula of 7-jointed antenna: 7, (1, 2), 3, (4, 5, 6). *Eyes* relatively small, sub-marginal. *Mouth-parts* fairly developed. Labium obscurely dimerous, its length approximately equal to its breadth at the base. Rostral loop long extending beyond the insertion of the third pair of legs. Anterior *spiracles* smaller than posterior spiracles, without pores. *Limbs* short and robust. Tarsus of hind pair (fig. 1, *d*) about two-thirds length of tibia whilst tibia is about three-fifths length of femur. Tibia + tarsus approximately equal to femur + trochanter. Tibia with a pair of stout spur-like setae at distal extremity of inner side. Femur and tibia with several small translucent pores. Claw falcate, acute, without denticle. Tarsal and ungual digitules normal, the latter being shorter and stouter than the former. *Posterior extremity* somewhat pointed, as shown in figure 1, *e*. *Paranal lobes* somewhat sclerotised. *Anal ring* comparatively large with two series of beads and six long setae which are approximately equal in length to the paranal setae. *Cerarii* confined to the paranal lobes only and consist of 4 to 5 conical spines of unequal sizes, a few spiniform setae and a loose group of trilocular pores. Other cerarii obsolete represented by 2 to 3 setae, without concentration of trilocular pores. *Dermis* with 3 types of pores:

1. Small *trilocular pores* of the usual type; these are more numerous on the dorsal dermis.

2. Very few large *discoid pores* confined to the ventral dermis of the three last abdominal segments.

3. Large dorsal pores with subcutaneous tubes, these are arranged at wide intervals in one or two rows across each abdominal segment and are also more or less scattered on the rest of the body but are more particularly present near the margin.

Ventral *body setae* scarce, except on the frons and on the three last abdominal segments. Dorsal body setae shorter and less numerous than the ventral setae. Anterior and posterior dorsal *ostioles* small, with tumid lips. Ventral ostiole not found.

Mauritius.—Collected by me, on *Pilea balfouri*. Cocotte Mt. (2350 ft.), 26.xi.1938. The *type* will be deposited in the collection of the British Museum (Natural History), the *paratype* is in my collection.

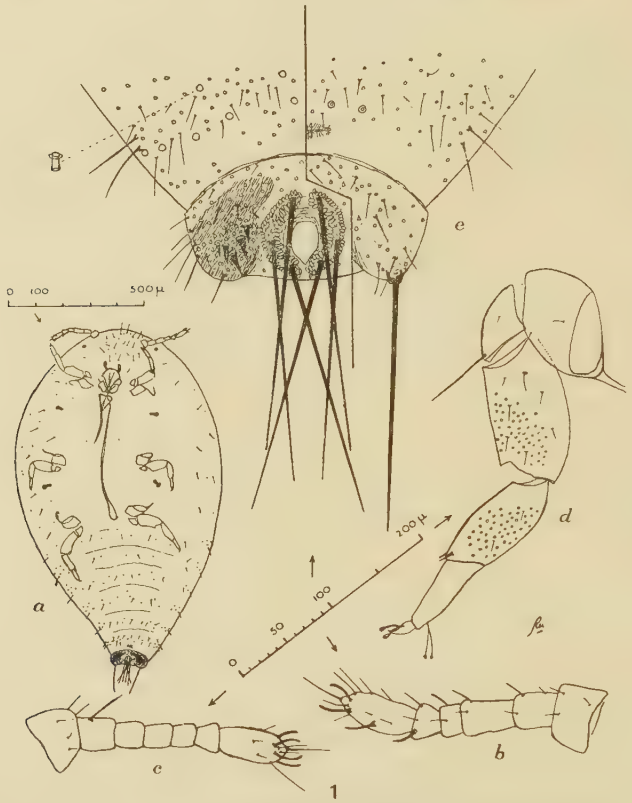
Remarks.—This species, though not typical of *Ripersia*, is provisionally assigned to that genus where it may rest until the whole group is critically reviewed and some sort of generic order and generic delimitation are recognised.

Pseudococcus pollicis sp. n.

Adult female (fig. 2, *a*), in 70 per cent. alcohol: oval, pale yellowish-pink, coated with a thin white waxy secretion. Tassels not developed. Segmentation distinct. Penultimate and antepenultimate segments produced into lobe-like prominences. No ovisac.

Length, 3·3–3·8 mm.; breadth, 1·9–2·5 mm.

Antennae (fig. 2, *b*) normally 8-jointed, each joint with several slender setae; terminal joint elongate and longest. The lengths of the antennal joints are variable : in one individual the following formulae were calculated; 8, (1, 2), 3, 5, (4, 7), 6 and 8, 2, 1, 3, 7, 5, (4, 6). In the other individual, one antenna was normal and had the formula 8, 1, 2, (3, 7), 5, 6, 4 and the other antenna was abnormal, (fig. 2, *c*), i.e., 7-jointed, with the terminal joint short; formula : 2, 1, 3, 4, (5, 7), 6. Length of second joint constant in each antenna of the two individuals examined. *Eyes* normal, roundish. *Mouth-parts* normal; labium obscurely dimerous, elongate, its breadth approximately $\frac{3}{4}$ of its length, tapering to an acute point

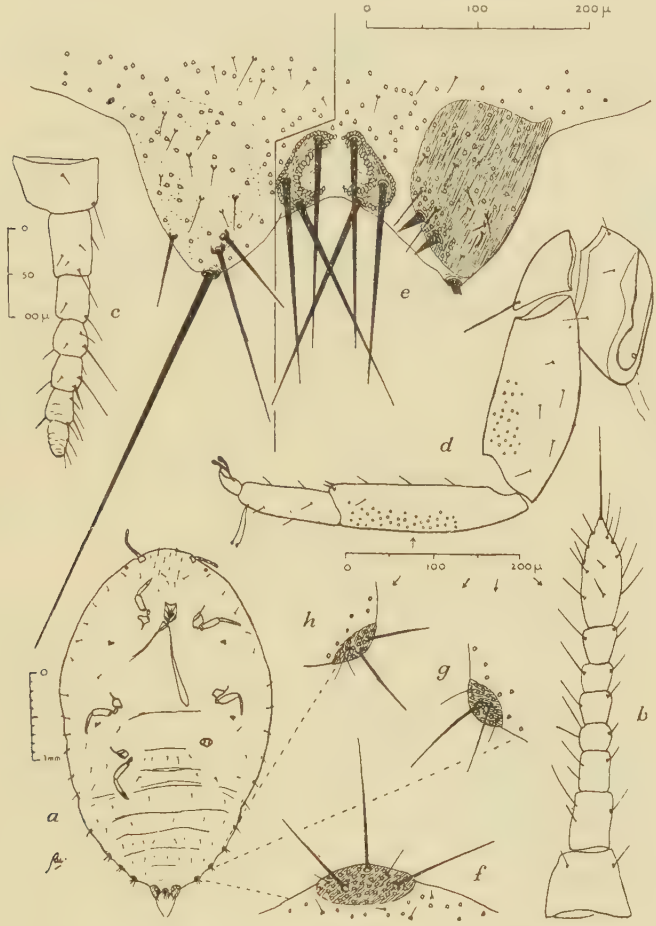


1

Fig. 1.—*Ripersia pileae* sp. n.—*a*, adult female, showing the arrangement of the dorsal pores with subcutaneous tubes; *b*, 6-jointed antenna; *c*, 7-jointed antenna; *d*, hind leg; *e*, posterior extremity.

bearing several short setae. Rostral loop extending to the insertion of the second pair of legs. Both *spiracles* of about the same size, without pores. *Limbs* fairly developed and robust. Tarsus of hind pair (fig. 2, *d*) approximately equal to half the length of tibia; tibia nearly equal in length to femur. Tibia + tarsus approximately equal in length to femur + trochanter. Inner surface of femur and distal extremity of tibia a few minute translucent pores. Coxa without translucent pores. Claw falcate, without denticle. Tarsal digitules filiform, longer than claw and minutely knobbed. Ungual digitules longer than claw but shorter and thicker than tarsal digitules, with conspicuously knobbed extremities. *Posterior extremity* (fig. 2, *e*) with prominent and sclerotised lobes. 8 pairs of abdominal *cerarii*. The paranal lobes bear each a pair of conical cerarian spines accompanied by a

few short auxiliary setae and a loose group of trilocular pores. The other abdominal cerarii not well developed, consisting of 1 to 3 long and stout setae, very few auxiliary short setae and a loose group of small trilocular pores. Thoracic and cephalic cerarii nearly obsolete, very poorly developed, consisting of 1 or 2 long setae surrounded by a small group of trilocular pores. All the cerarii, particularly those of the abdominal region (fig. 2, *f*, *g*, *h*), are supported by a small sclerotised patch. The sclerotised patches on the lobular



2

Fig. 2.—*Pseudococcus pollicis* sp. n.—*a*, adult female; *b*, normal 8-jointed antenna; *c*, abnormal 7-jointed antenna; *d*, hind leg; *e*, posterior extremity; *f*, penultimate cerarius; *g*, antepenultimate cerarius; *h*, pre-antepenultimate cerarius.

prominences of the abdomen prior to the terminal segment possess well-defined boundaries. *Anal ring* somewhat recessed between the paranal lobes, with two concentric series of beads of the usual type and with six stout setae which are approximately equal to two-thirds the length of the paranal setae. *Dermis* with the usual *trilocular* pores. The large *discoid* pores are entirely absent. *Body setae* long and stout, particularly in the cephalic region, more or less disposed in a single row on each abdominal segment. *Dorsal ostioles* small, with somewhat tumid lips. Ventral ostiole narrow.

Mauritius.—This species was collected by me, whilst beating branches of an endemic tree, on the Pouce Mountain (2661 ft.), 2.xi.1938. The type will be deposited in the collection of the British Museum (Natural History), the paratype is in my collection.

Remarks.—This species, though not typical of *Pseudococcus*, is temporarily assigned to that genus in which it is less likely to create confusion. The paranal lobes and the constitution of the cerarii are not characteristic of *Pseudococcus*. An also striking feature is the total absence of the large discoid pores which are usually present in every adult female belonging to that genus. The two individuals on which the above description was based are fully adult females since they contain numerous embryos.

Mascarenococcus gen. n.

Referable to the Pseudococcinae and characterised by the following diagnosis :

Adult female elongate oval, with (in genotype) antennae geniculate and 5-jointed of which the third joint longest, terminal joint short, without falciform setae. Interantennal space relatively wide. Eyes well developed. Labium short and broad. Limbs stout. Claw without denticle. Both tarsal and ungual digitules well developed, terminally dilated. Sixteen pairs of cerarii composed of dense groups of conical spines. Paranal lobes well developed. Anal ring relatively large, with six setae and numerous, small, roundish and closely set beads arranged into more or less concentric series. Dorsal dermis with numerous setae and trilocular pores; ventral dermis with numerous more slender setae and large discoid pores. Dorsal ostioles present.

Genotype : *Mascarenococcus pandani* sp. n.

Related to *Rhizoecus* Kunck. by the 5-jointed, geniculate antennae only.

Mascarenococcus pandani sp. n.

Adult female (fig. 3, *a*) elongate oval, flattish, somewhat covered by a layer of white mealy secretion, with well-developed tassels particularly on the posterior extremity. No ovisac. A long filament consisting of white waxy secretion arises from the anal region. Segmentation particularly distinct marginally. Length, 1·8–2·5 mm.; breadth, 1·2–1·8 mm.

Antennae (fig. 3, *b*) geniculate, 5-jointed; basal joint robust, third joint longest, fourth joint always the shortest. Each joint with several long and slender setae. Formula : 3, 1, 5, 2, 4. In one individual the 5th joint was shorter than the 2nd joint. Interantennal space nearly equal to length of antenna. *Eyes* (fig. 3, *b*) very prominent, projecting beyond margin of body. *Mouth-parts* well developed, situated between the coxae of the first pair of legs. *Spiracles* without pores. *Limbs* short and very stout. Tarsus of third leg (fig. 3, *c*) equal to approximately half length of tibia; tarsus + tibia nearly equal to $\frac{7}{8}$ length of femur + trochanter. Tibia with stout spiniform setae. Femur swollen. Inner surfaces of tibia and femur with numerous translucent pores. Claw stout, bluntly pointed, striated, without denticle. Tarsal digitules filiform, longer than claw and minutely knobbed. Ungual digitules longer than claw but shorter and thicker than tarsal digitules, with conspicuously knobbed extremities. Anal ring (fig. 3, *d*) large, somewhat recessed, with six stout setae and numerous, small, roundish, closely set beads arranged into more or less concentric series. *Paranal lobes* (fig. 3, *e*) well developed and broadly rounded; each bearing on its dorsal surface the conical spines of the cerarii and on its ventral surface a fairly long seta, which is approximately equal in length to the anal ring setae, and a few, stout, shorter setae. Sixteen pairs of well-developed *cerarii*. The cerarii are situated on well-defined sclerotised patches and consist of an agglomeration of slender conical spines and trilocular pores; ocular cerarii always the smallest. Cerarian spines of posterior cerarii (fig. 3, *f*1)

larger than those of anterior cerarii (fig. 3, *f*2). Dorsal *dermis* with numerous trilocular pores and numerous, short, stout setae. Ventral dermis with numerous large discoid pores, scattered throughout its whole surface, and numerous, short, slender setae. Numerous

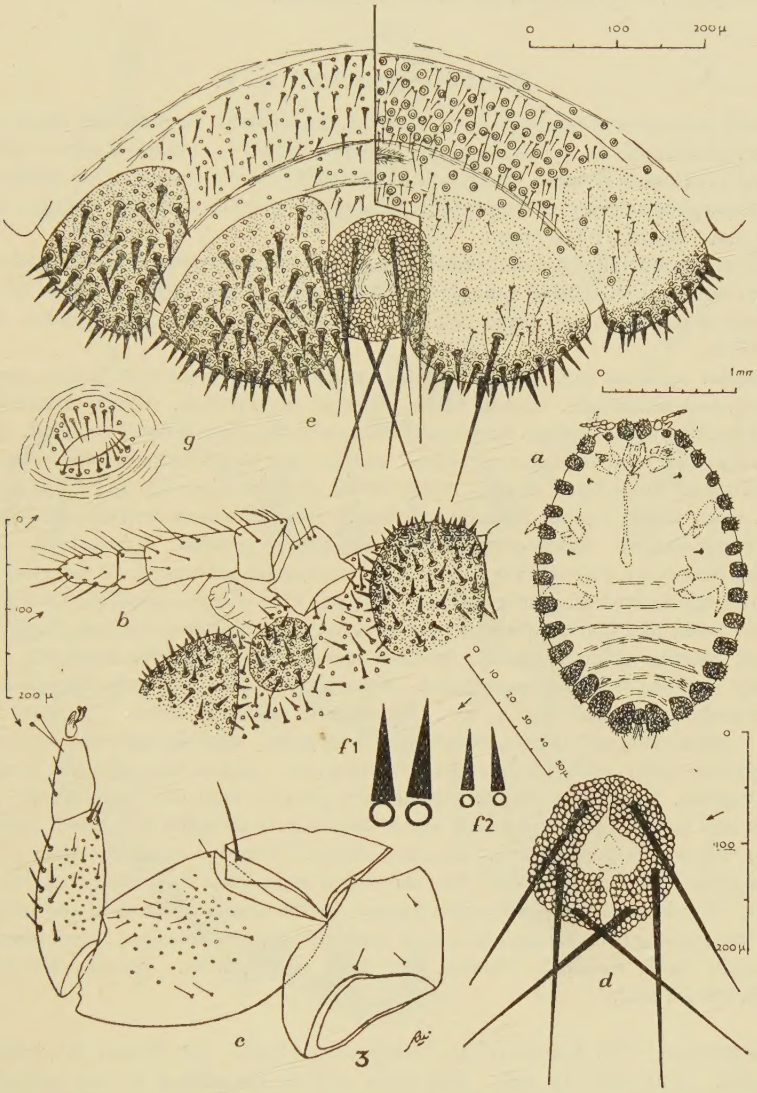


FIG. 3.—*Mascarenococcus pandani* gen. et sp. n.—*a*, adult female; *b*, cephalic area showing antenna, eye, cephalic and ocular cerarii; *c*, third leg; *d*, anal ring; *e*, posterior extremity; *f*1, cerarian spines of paranal cerarii; *f*2, cerarian spines of cephalic cerarii; *g*, posterior dorsal ostiole.

spinules, in groups of 2 to 7, are also present on the ventral surface of the abdominal segments. Dorsal *ostioles* present: anterior pair very small, nearly inconspicuous; posterior pair (fig. 3, *g*) larger, with tumid lips. Ventral ostiole elongate and narrow.

Mauritius.—This species was discovered by me between the adpressed bases of the leaves situated near the extremity of the stems of *Pandanus microcarpus* at Riche en Eau on 25.xi.1938.

The type will be deposited in the collection of the British Museum (Natural History) and the paratypes are in my collection.

Pseudoleucaspis halli sp. n.

Female puparium elongate, narrow, straight, transparent, showing the black nymphal exuvium underneath it, white in colour, glassy in texture, somewhat convex where the nymphal exuvium is situated, the rest being flattish. *Larval exuvium* pale golden yellow, shiny, situated at anterior extremity of puparium and projecting beyond margin. Breadth, 0·4–0·5 mm.; length, 1·3–1·9 mm.

Male puparium dull yellowish, translucent. Median area convex; submarginal area and posterior area flattish, dilated behind; larval exuvium shiny, darker, situated at anterior extremity of puparium and projecting beyond margin. Length, 1·6–1·9 mm.; breadth, 0·7–0·9 mm.

Nymphal exuvium (fig. 4, *a*) elongate, opaque black, somewhat shiny, completely enclosing the adult female. Resists action of 10 per cent. potash. Easily cleared by using strong bleaching agents such as oxygen and chlorine. *Pygidium* broadly rounded. Pygidial margin (fig. 4, *b*) with two pairs of *trullae*: median pair about twice as long as large, with rounded apex. Second pair duplex; inner lobule of about same size and shape as median trullae, outer lobule smaller than inner lobule. Margin beyond trullae with sclerotised, serrated incrassations. *Squames* simple, stout and acutely pointed. Spines short. Marginal *pores* well developed, with short tubular ducts. *Anal orifice* subcentral. A few clear patches present on the dorsal surface of pygidium. Length, 1·2–1·8 mm.; breadth, 0·4–0·5 mm.

Adult female (fig. 4, *c*) completely enclosed in nymphal exuvium, elongate, flatly rounded in front, sharply pointed behind, broadest across the abdominal segments. *Dermis* markedly wrinkled and finely granulated. Mesal area of meso- and meta-thoracic segments conspicuously granulated (fig. 4, *d*). *Mouth-parts* relatively large. *Antennal tubercles* (fig. 4, *e*) prominent, each with two stout and long hairs. Anterior *spiracles* each with one parastigmatic pore; posterior spiracles without pores. Abdominal segments more or less fused together. *Pygidium* (fig. 4, *f*, *g*) acutely pointed, with two pairs of very minute, elongate and faintly sclerotised *trullae* which can easily be detected at × 900. Median pair longest. *Perivulvar pores* absent. *Squames* absent. Very few small roundish *pores* with short tubular ducts scattered on the abdominal segments, particularly on the lateral surfaces. A few similar pores are also present on the lateral surfaces of the metathorax and of the pygidium. Submarginal area of pygidium with conspicuous, short, stout *spines*. *Anal orifice* large, roundish, situated near base of pygidium. Length, 0·6–0·8 mm.; breadth, 0·2–0·3 mm.

Mauritius.—On leaves of an indigenous plant. Le Pouce Mt. (2661 ft.), 2.xi.1938. Collected by me. The type will be deposited in the collection of the British Museum (Natural History), the paratypes are in my collection.

Remarks.—I hesitate to separate this species from *Pseudoleucaspis*; the second pair of trullae, which is duplex, and the presence of well-developed tubular pores on the pygidial margin of the *nymphal exuvium* being the reasons for such separation. Apart from these characters this insect agrees well with *Pseudoleucaspis*.

I am pleased to name this species after Dr. W. J. Hall, in recognition of the kind interest he showed in helping me in many various ways.

Lepidosaphes vinsoni sp. n.

Female puparium elongate, light reddish-brown, somewhat convex, dilated behind; marginal area paler. *Larval exuvium* bright golden yellow, shiny, with a median carina,

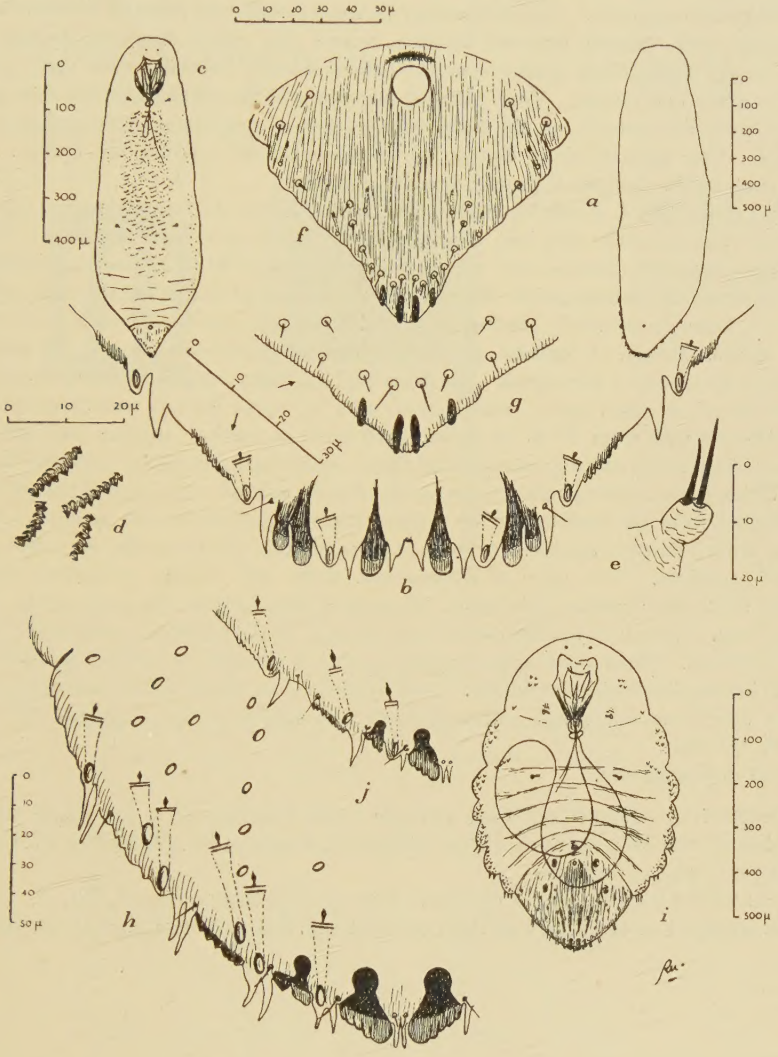


FIG. 4.—*Pseudoleucaspis halli* sp. n.—*a*, nymphal exuvium; *b*, pygidial margin of nymph; *c*, adult female; *d*, granulations of mesal area of meso-metathoracic segments; *e*, antennal tubercle; *f*, pygidium of adult female; *g*, magnified pygidial margin of adult female. *Lepidosaphes vinsoni* sp. n.—*h*, pygidial margin of nymph; *i*, adult female; *j*, pygidial margin of adult female.

translucent, darker on the posterior extremity, projecting beyond the margin of the puparium. *Nymphal exuvium* reddish-brown, obscured by a layer of whitish secretion. *Ventral scale* represented as a white scar left on the food-plant when the puparium is removed. Length, 2·7 mm.; breadth, 0·8 mm.

Male puparium minute, very pale brown to whitish, broadest across its middle, not carinated. *Larval exuvium* pinkish, projecting beyond the margin of the puparium. Length, 0·8–1·0 mm.; breadth, 0·3–0·4 mm.

Nymphal exuvium oval, sharply divided by a transverse furrow between the thoracic and abdominal segments. *Pygidial margin* (fig. 4, *h*) with two pairs of *trullae*: median pair larger, with coarsely serrated margin; second pair small, obscurely duplex, inner lobule larger, outer lobule faintly conical. Lateral margin beyond trullae finely serrate. *Squames* short and simple. Four pairs of marginal tubular oval *pores*. A few smaller tubular pores also present on the basal lateral areas of pygidium. *Spines* shorter than squames. Two pairs of short clavate *paraphyses* situated opposite the trullae. *Anal orifice* oval, small. Length, 0·8 mm.; breadth, 0·5 mm.

Adult female (fig. 4, *i*) reddish-yellow, oval, largest across the first abdominal segments. *Antennal tubercles* each with two stout bristles. *Mouth-parts* well developed; rostral loop long. Anterior *spiracles* each with a compact group of 30 to 31 parastigmatic pores. Posterior spiracles without pores. Margin of metathorax and abdominal segments strongly produced, strongly wrinkled, bearing large oval pores with short tubular ducts and short gland spines. Margin of cephalic, prothoracic and mesothoracic segments also bearing a few gland spines and a few spines. *Pygidium* (fig. 4, *j*) large, rather bluntly pointed, with five groups of *perivulvar pores*: mesal group with 10, upper laterals with from 20 to 21, lower laterals with from 13 to 16 pores. Two pairs of *trullae*; median pair not fused together, larger, with coarsely serrated free edge; second pair very small, obscurely duplex: inner lobule larger, outer lobule inconspicuous, faintly conical. The second pair of trullae is separated from the median pair by a space nearly equal to its own breadth. Margin beyond trullae strongly serrate. *Squames* in pairs, simple, shorter at the apex than at the base of pygidium. Two pairs of conspicuous, short and clavate *paraphyses* situated opposite the trullae; median pair larger. Six pairs of large tubular oval *pores* on the margin of pygidium. Other oval tubular dorsal pores present on the pygidium, particularly on the lateral surfaces. Mesal apical area of pygidium with 4 elongate, sclerotised patches which seem to be associated with the trullae. *Anal aperture* oval, situated near base of pygidium. *Dermis* somewhat sclerotised and exhibiting a wrinkled pattern. Length, 0·7 mm.; breadth, 0·4 mm.

Adult male unknown.

Mauritius.—Described from a single adult female and a few male puparia collected by me on a stem of *Pilea balfouri* on Cocotte Mt. (2350 ft.), 27.xi.1938.

Type in my collection.

It is with pleasure that I dedicate this species to my friend, Mr. J. Vinson, who is engaged in the study of the Coleopterous fauna of the Mascarene Islands.